

**What we Claim is:**

1. A pipe stopper for inserting within a pipe comprising:  
two rigid circular plates;  
5 an outwardly-expandable flexible seal located between peripheral  
surfaces of the plates;  
a projection rigidly secured to or integral with a first of the plates and  
extending slideably through an aperture defined by the second plate;  
a lever pivotable about an axis through the projection;  
10 cam means rigidly secured to or integral with the lever such that said  
lever is pivotable between a first orientation in which the flexible seal is  
relatively undistorted and a second orientation in which the cam means  
force the plates towards each other so as to axially compress and radially  
expand the seal for engaging with sealing contact with a wall of a pipe; and  
15 a member rigidly secured to or integral with part of a remote  
peripheral surface of one of the plates, said member extending from the  
plate such that when the pipe stopper is located within a pipe said member  
provides a reactive force to tilting of the pipe stopper from its operative  
position.  
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2. An expandable pipe stopper according to claim 1, wherein the  
member is integral with or rigidly secured to the second plate.
3. An expandable pipe stopper according to claim 1, further  
25 comprising a pivot mechanism about which said lever is pivotable, wherein  
said projection defines a part of said pivot mechanism defining said axis  
through the projection, and the distance from the first plate to the axis  
through the projection is fixed.
- 30 4. An expandable pipe stopper according to claim 1, wherein

said projection defines a pair of recesses concentric with said axis through the projection, and the lever carries two pivot pins each of which has an enlarged head adapted to fit in an associated recess.

5           5.     An expandable pipe stopper according to claim 1, wherein said projection defines a pair of recesses concentric with said axis through the projection, each recess having an associated cranked slot, and the lever carries two pivot pins each of which has:

10                 an enlarged head adapted to fit in an associated one of said recesses;

                  and an eccentric portion configured to (i) slide through one of the cranked slots to install the lever on the projection while the lever is in a third orientation and (ii) resist sliding through the cranked slot when the lever is rotated between the first orientation and the second orientation.

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                  6.     An expandable pipe stopper according to claim 5, wherein said eccentric portions of said pivot pins have a flat side to provide said eccentric portions with eccentricity.

20           7.     An expandable pipe stopper according to claim 1, wherein said projection is a single projection extending along the common axis of said plates.

                  8.     An expandable pipe stopper according to claim 7, wherein  
25                 said projection and said aperture are configured to prevent relative rotation of said plates.

                  9.     An expandable pipe stopper according to claim 1, having a  
30                 second projection extending from said first plate, and an associated aperture in said second plate through which the second projection extends,

wherein said lever is pivotally mounted between the two projections.

**10.** An expandable pipe stopper according to claim 1, wherein said lever is connected to an elongate handle by a hinging mechanism.

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**11.** An expandable pipe stopper according to claim 1, wherein said handle is telescopically foldable.

**12.** An expandable pipe stopper for inserting within a pipe comprising:

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two rigid co-axial circular plates;

an outwardly-expandable annular flexible seal located between adjacent peripheral surfaces of the plates;

a projection rigidly secured to or integral with a first one of said plates and extending slideably through an aperture defined by the second one of said plates;

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a collar connected to the projection;

a lever pivotally mounted on the collar; and

cam means fixed to the lever;

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wherein said lever is pivotable between a first position in which the flexible seal relatively undistorted and a second position in which the cam means force the plates relatively towards each other so as to compress the seal causing it to radially expand, and

said lever is pivotable about an axis through the collar such that said axis is offset from the centre-line of the projection.

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**13.** An expandable pipe stopper according to claim 12, further comprising a member fixed to or integral with the collar and adapted to contact a bore of a pipe so as to provide a reactive force to tilting of the stopper out of its operative position perpendicular to the axis of the pipe;

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5           **14.**   An expandable pipe stopper according to claim **12**, further comprising a wear plate disposed between said collar and said second plate and having an aperture through which the projection extends, such that said cam means are configured to act on said wear plate.

10           **15.**   An expandable pipe stopper according to claim **15**, wherein said wear plate is provided with a plurality of concentric ribs which contact the second plate.

**16.**   An expandable pipe stopper according to claim **14**, wherein the projection as a male thread and the collar has a mating female thread, whereby the collar is adjustable in axial position along the projection.

15           **17.**   An expandable pipe stopper according to claim **12**, wherein said projection defines a pair of recesses concentric with said axis through the projection, each recess having an associated cranked slot, and the lever carries two pivot pins each of which has:

20                 an enlarged head adapted to fit in an associated one of said recesses;

                      and an eccentric portion configured to (i) slide through one of the cranked slots to install the lever on the projection while the lever is in a third orientation and (ii) resist sliding through the cranked slot when the lever is rotated between the first orientation and the second orientation.

25           **18.**   An expandable pipe stopper according to claim **17**, wherein said eccentric portions of said pivot pins have a flat side to provide said eccentric portions with eccentricity.

30           **19.**   An expandable pipe stopper according to claim **12**, wherein

the member is fixed on the collar to one side of the projection and the offset axis of the lever is on the opposite side.

**20.** A pipe stopper comprising:

- 5 a pair of co-axial plates;  
a flexible seal located between the plates, said seal being configured to radially expand for sealing a pipe;  
a cam configured to act on one of the plates to bring said plates together to radially expand the flexible seal; and  
10 a pivotally mounted lever rigidly attached to or integral with said cam;  
and an elongate handle pivotally attached to said lever at a position remote from said cam, such that said lever is operable by applying a force along said handle.

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**21.** A pipe stopper according to claim **20**, having a means for preventing the angle between the elongate handle and the lever from opening past a predetermined angled.

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**22.** A pipe stopper according to claim **21**, wherein said predetermined angle is obtuse to allow the flexible seal of the pipe stopper to be lowered below ground level and positioned within a pipe by manual manipulation of said elongate handle.

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**23.** A pipe stopper according to claim **20**, wherein said lever comprises shorter lever secured within a lever extension arm, and said lever extension arm is pivotally connected to said handle.

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**24.** An pipe stopper according to claim **20**, wherein said pipe stopper further comprises a contacting member rigidly secured to one of

said plates and configured to contact the bore of a pipe to provide a reactive force to tilting the stopper when located within said pipe.

5           **25.** An expandable pipe stopper according to claim **24**, further comprising a projection rigidly attached to or integral with one of said plates,

          wherein said projection is located within an aperture in the other of said plates, said lever is pivotally connected to said projection and said cam acts on the other of said plates.

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**26.** A remote installation device for installing an expandable pipe stopper comprising:

          an arm configured to be rigidly attached to a lever of a pipe stopper;

          an elongate handle connected to said arm by a hinging mechanism;

15           and

          a stopping means which prevents the angle between the handle and the member increasing beyond a predetermined value.

20           **27.** A conversion kit for an expandable pipe stopper for inserting within a pipe comprising:

          a collar having a screw-threaded hole configured to be connected to a screw-threaded projection on a pipe stopper;

          a lever pivotally mounted on the collar such that it is pivotable about an axis through the collar;

25           cam means fixed to the lever; and

          a wear plate defining an aperture configured to fit around the projection of a pipe stopper,

          wherein said lever is pivotable between a first position and a second position in which the cam means applies force to the wear plate to radially expand the flexible seal, and

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said lever defines a aperture remote from said axis through the collar, said aperture being configured to receive a rope for pulling the lever from said second position to said first position.

5           **28.**   A conversion kit for an expandable pipe stopper according to claim **27**, wherein said lever comprises:

          a pair of arms extending from the cam means;

          a handle which joins said arms remote from said cam means; and

          a retaining member rigidly attached between the arms,

10       wherein said aperture is defined by said retaining member, said handle and a portion of said arms.